

The Vertebrate Fauna of Houtman's Abrolhos (Abrolhos Islands), Western Australia. By W. B. ALEXANDER, M.A., Late Keeper of Biology in the Western Australian Museum. (Communicated by Dr. W. J. DAKIN, Professor of Zoology in the University of Liverpool.)

[Percy Sladen Trust Expedition to the Abrolhos Islands under the leadership of Prof. W. J. DAKIN.]

[Read 17th March, 1921.]

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INTRODUCTION.

THE first reference to the fauna of the Abrolhos is contained in the journal of Francis Pelsart, 1629 (1). He states that in the two or three large islands (the Wallaby Islands) there were large numbers of a "species of cats," of which he gives a very good description, the first proper account of a species of kangaroo written, though I am not sure whether it was published till 1899, as it was omitted from the popular account of his voyage published at the time. He adds that in these two islands they found a number of grey turtle-doves, but no other animals.

Capt. Wickham, in command of H.M.S. 'Beagle,' surveyed the islands in April 1840, and the officers under him made considerable collections, which are now in the British Museum—unfortunately, in most cases with nothing to indicate on which islands they were obtained. In his account of the



voyage (2) Stokes mentions hair-seals seen at Pelsart Island and Rat Island, the latter obtaining its name from "the quantity of that vermin with which it was infested." The Wallaby Islands derived their name likewise from the number of those animals found on them, and Stokes remarks specially that not a single wallaby was found on North Island. On Rat Island they obtained numbers of a lizard, named *Silubosaurus stokesii* by J. E. Gray in the appendix to the volume. One of these Lieut. Emery brought alive to England. The Pigeon Islands were so named because "the common Bronze-winged Pigeon" was found there in great numbers. The burrows of the Sooty Petrel or Mutton-bird are mentioned as abundant on Rat Island and the south-west side of West Wallaby Island. Stokes remarks that the birds met with on Houtman's Abrolhos, with the exception of one resembling in shape and colour a small quail (*Hemipodius scintillans*, Gld.) numerous on North Island, were known and common on the mainland.

In 1842 Gould's collector, John Gilbert, visited the islands, and wrote a vivid account of the nesting-habits of some of the sea-birds. He also seems to have made large collections of the reptiles etc., which are now in the British Museum.

In 1889 the group was visited by Mr. A. J. Campbell, who wrote an account of the fauna (3), partly from information given him by Mr. Broadhurst, whose firm had commenced working the guano, and by Mr. Beddoes, the firm's manager on the islands.

In 1894 Mr. O. Lipfert spent three months at the Abrolhos at the invitation of Mr. Broadhurst, collecting for the Western Australian Museum. I have to thank Mr. Lipfert for lending me a manuscript list of the birds that he found nesting.

In 1897 Mr. R. Helms paid a short visit to the islands accompanied by Mr. Lipfert, and in 1902 an account of his visit was published (4). He added somewhat to the list of birds given by Campbell. In 1899 the islands were visited by Mr. R. Hall, who published a list of the birds (5), adding a few not recorded by Helms.

In 1907 the Abrolhos Islands were visited by a party, amongst whom were Messrs. Milligan, Conigrave, and Gibson. The last wrote an account of the birds met with (6). Specimens obtained by Milligan and Conigrave are in the W. A. Museum.

I visited the islands with Prof. Dakin in November 1913, with funds provided by the Percy Sladen Trust, and, where not otherwise mentioned, the observations hereafter recorded were made on that visit*. Mr. J. McMillan, who accompanied us, gave valuable assistance on this expedition.

* [This was the first Percy Sladen Trust expedition to the Abrolhos Islands, the second was made in 1915.—W. J. D.]

SECTION I.—The Land Vertebrates.

MAMMALIA.

Rodentia. MURIDÆ.

EPIMYS FUSCIPES (*Waterhouse*) (not Gould). Dusky-footed Rat.

Two examples of this species, obtained in November 1907, are in the Western Australian Museum. They were caught on the sand-hills on East Wallaby Island, the only locality in which we met with the species.

The Abrolhos specimens are decidedly smaller than those in the W.A. Museum from other localities, and their skulls are narrower in proportion to their length. As the teeth are only slightly worn, it is probable that both specimens are young, and these differences may be due to age. When a longer series is available, it may be necessary to create a subspecies for them.

Marsupialia. MACROPODIDÆ.

MACROPUS EUGENII HOUTMANNI (*Gould*). Dama Wallaby or Tammer.

As already mentioned, this wallaby was first met with by Pelsart in 1629 on "two or three of the larger islands." The types of *Macropus houtmanni*, Gould, were obtained by the naturalists of the 'Beagle' in 1840 on East and West Wallaby Islands, the only islands on which they are found, and are in the British Museum, together with specimens obtained by Gilbert. In 1888 Oldfield Thomas wrote (7) : "I have come to the conclusion that it is impossible to admit more than a single western species, notwithstanding the very striking differences that exist between the individuals long isolated in the islands of the Houtman's Abrolhos and those living on the mainland. The differences fade away on the examination of a large series, and specimens from the small islets close to the coast are as a rule more or less intermediate."

Since 1888 the general use of trinomials to designate differences of this nature leads me to suppose that Mr. Thomas would now adopt the nomenclature I am using, especially when it is borne in mind that the small islands to which he refers as inhabited by intermediate forms are not geographically intermediate, but lie off the south coast of Australia at the opposite extremity of the range of the species on the mainland.

The animals are very plentiful on the two islands which they inhabit, chiefly amongst the coastal sand-hills and on the portions of the islands where the limestone rock outcrops. These are the only regions where the bushes are large enough to afford them cover during the daytime, which they appear to spend in the shade, only coming out at night.

Introduced Mammals.

Stokes found great numbers of rats on Rat Island, but it is not clear whether these were *Rattus (Epimys) fuscipes* or *R. rattus* or *R. norvegicus*. If they were from the latter they were presumably the result of one of the numerous shipwrecks which occurred on the islands from 1629 onwards. Rats are stated also to have occurred on Pelsart Island, but we did not meet with them on either of these islands. Rabbits also were formerly found on Pelsart Island, though there is no evidence as to how they got there.

Unfortunately, the domestic cat has been introduced. We saw an individual on Rat Island and the tracks of one on Pelsart Island, and this probably accounts for the disappearance of the rodents, as well as the larger lizards, on these groups. It is to be hoped that they will not reach the Wallaby Group.

REPTILIA.

Ophidia. BOIDÆ.

PYTHON SPILOTES VARIEGATUS (Gray). Carpet-Snake. Plentiful on West Wallaby Island. The largest individual we met with was about 7 ft. in length.

COLUBRIDÆ.

DENISONIA CORONATA (Schleg.). Crowned Whip-Snake. The British Museum has a specimen obtained by Gilbert. A small grey snake seen by me on East Wallaby Island, but unfortunately not captured, was probably of this species.

RHYNCHELAPS BERTHOLDI (Jan). Ringed Snake. Mr. Lipfert obtained a specimen of this species on West Wallaby Island in 1895. A large example obtained by the guano-workers was forwarded to Prof. Dakin in 1915, and is now in the W.A. Museum.

Lacertilia. GECKONIDÆ.

GYMNODACTYLUS MILIUSII (Bory). Flat-tailed Gecko. Frequent on West Wallaby Island; also found on Pigeon Island.

HETERONOTA BYNOEI (Gray). The types of this species, in the British Museum, were obtained on Houtman's Abrolhos.

PHYLLODACTYLUS MARMORATUS (Gray). The types, in the British Museum, are from the Abrolhos.

PHYLLODACTYLUS OCELLATUS (Gray). The types of *P. bilineatus*, Gray, regarded by Boulenger as a synonym of this species, were obtained on the Abrolhos.

DIPLODACTYLUS SPINIGERUS, *Gray*. The types, in the British Museum, are from the Abrolhos. We obtained two specimens on West Wallaby Island.

DIPLODACTYLUS VITTATUS, *Gray*. The types of *D. ornatus*, *Gray*, regarded by Boulenger as a synonym of this species, were collected on Houtman's Abrolhos.

PEROPUS VARIEGATUS (*Dum. & Bibr.*). A specimen in the British Museum is from Houtman's Abrolhos.

PYGOPODIDÆ.

DELMA FRASERI, *Gray*. Fraser's Slow-worm. We met with two individuals of this species on West Wallaby Island.

LIALIS BURTONIS, *Gray*. Burton's Slow-worm. The British Museum has a specimen from Houtman's Abrolhos. We met with one example on West Wallaby Island.

AGAMIDÆ.

AMPHIBOLURUS BARBATUS (*Cuv.*). Jew Lizard. Plentiful on East and West Wallaby Islands and North Island, especially amongst the sand-hills. Often observed in the bushes a couple of feet from the ground.

SCINCIDÆ.

EGERNIA WHITEI (*Lacep.*). The British Museum has a specimen from the Abrolhos.

EGERNIA KINGI (*Gray*). Common on West Wallaby Island, chiefly in the region covered by flat slabs of limestone, under which it lurks during the daytime. Also met with on East Wallaby Island and the Pigeon Islands.

EGERNIA STOKESI (*Gray*). Very plentiful wherever there are loose rocks on the East and West Wallaby Islands and Pigeon Islands. Sometimes as many as four or five individuals will be found by turning over a single stone. At the time of Stokes's visit it was evidently common on Rat Island, and Campbell also met with it there in 1889. I think that it has probably been destroyed on that island by the introduction of cats.

TRACHYSAURUS RUGOSUS, *Gray*. Stump-tailed Lizard. The British Museum has a specimen from Houtman's Abrolhos.

LYGOSOMA LESUEURI, *Dum. & Bibr.* The British Museum has a specimen obtained on the Abrolhos.

LYGOSOMA RICHARDSONI (*Gray*). The type, in the British Museum, is from the Abrolhos.

LYGOSOMA QUADRILINEATUM (*Dum. & Bibr.*). The British Museum has a specimen from the Abrolhos.

LYGOSOMA sp. A small species with an orange head and pink throat was very common in sandy localities on the Wallaby Islands. A specimen which I obtained is in the W. A. Museum, and appears to belong to a new species, but I hope to obtain further specimens. The small lizards of this genus are so active that they are very difficult to obtain, and several other species probably occur. A small form which lives among the scrub was seen on Long Island and Sandy Island in the Wallaby Group, as well as on Rat Island and Pelsart Island. A rather larger species was also observed on Rat Island.

LYGOSOMA PRÆPEDITUM, *Blng.*, is recorded by Campbell.

AMPHIBIA.

Anura.

CYSTIGNATHIDÆ.

LYMNODYNASTES DORSALIS (*Gray*). Specimens from Houtman's Abrolhos are in the British Museum.

BUFONIDÆ.

MYOBATRACHUS GOULDI (*Gray*). Specimens from the Abrolhos are in the British Museum.

We did not see any Amphibia, but on Pigeon Island and Long Island we heard sounds after dark which sounded like those made by some species of frog. Considerable search with a lantern on Pigeon Island failed to reveal the animals from which these noises emanated.

LAND-BIRDS.

Turniciformes.

TURNICIDÆ.

ORTYGODES VARIUS SCINTILLANS (*Gould*). Painted Quail.

Common on East and West Wallaby Islands, one of the Pigeon Islands, and North Island. At the time of our visit in November 1913 the breeding-season seemed to be practically over, as young birds were met with which could fly almost as strongly as the adults.

The Abrolhos birds were described by Gould (P. Z. S. 1845, p. 62) as a distinct species, "*Hemipodius scintillans*," described as "very nearly allied to but much smaller than *H. varius*." In the 'Birds of Australia' Gould writes that the species "much resembles *H. varius*, but is little more than half the size of that species; independently of which the colouring is much lighter, more varied and sparkling, the white margins of the back feathers more numerous and conspicuous, and the markings of the throat and breast of a crescentic instead of an elongated form."

In 1911 Mathews (8) separated the form of *Turnix varia* found in South-West Australia as *T. varia stirlingi*, writing that it "agrees with *T. varia scintillans* in its darker upper coloration but differs in its much paler under-surface and more white on the ear-coverts."

In 1913 the same writer (9) placed his own *T. varia stirlingi* as a synonym of *T. varia scintillans*, Gould.

As Mr. Mathews informed me that he had not examined any birds from the Abrolhos, I presume he was relying on Gould's description in taking this action. There are two Abrolhos birds in the Western Australian Museum obtained in 1894, and in my opinion they are quite sufficiently different from birds from the mainland as to need a subspecific name. They are much lighter in colour than all the birds from the mainland, for which I will use Mathews's name of *T. varia stirlingi*. Now, though Gould's figure shows *scintillans* as "darker" than *varius*, in the description he says it is "lighter." In the second place, the white patch on the throat extends further down, and the white markings on the breast are fairly narrow, only widening a little towards the tip instead of being crescentic as in *stirlingi*. I cannot help thinking that Gould meant to write that they were "of an elongated instead of a crescentic form," instead of the exact opposite. In addition, both the specimens of *scintillans* have far more white spots on the cheeks and head than any of the specimens of *stirlingi*, in none of which do they extend right across the back of the head; moreover, these spots and the streaks on the breast are white instead of buffish, which I presume is what Gould referred to when he said the colouring was "more varied and sparkling." Other slight differences noticed are that the black patches on the back are distinctly more broken up by cross-bars in *scintillans*, the reddish colour on the sides of the breast extends much further down, and, as noted by Gould, "the white margins of the back feathers are more numerous and conspicuous."

In making these comparisons I have had before me the two specimens of *Ortygodes varius scintillans* from the Abrolhos, seven specimens of *O. varius stirlingi* from localities from Perth to Denmark, W.A., and one specimen of *O. varius varius* from Queensland.

Columbiformes.

C O L U M B I D Æ.

COSMOPELIA ELEGANS NEGLECTA, *Mathews*. Brush Bronze-wing Pigeon.

Plentiful on East and West Wallaby Islands and North Island, though, curiously enough, we did not meet with them on the Pigeon Islands, which Stokes named from their abundance there. A nest containing one fresh egg was found by me on East Wallaby Island in November 1913, and Hall captured a young bird that had just left the nest on Pigeon Island in November 1899. "Grey Turtle-Doves" were seen by Pelsart on the Wallaby Islands in 1629. Stokes recorded them as the "Common Bronze-winged Pigeon" and Campbell as *Phaps chalcoptera*. Owing to their rapid flight and their habit of flying just over the bushes and then ducking down again, it is by no means easy to get a good view of them, and perhaps Campbell did not secure a specimen. There are two specimens from the Abrolhos in the W.A. Museum, obtained in 1894, and I cannot discover any differences between them and specimens from the mainland, though they are both distinctly below the average in size.

Ralliformes.

R A L L I D Æ.

HYPOTÆNIDIA PHILIPPENSIS (*Linn.*). Buff-banded Rail.

Campbell saw this species on Rat and Pelsart Islands, and states that it is known to breed on the latter. We did not meet with the species. Birds from this locality would presumably be *H. p. mellori*, *Mathews*.

PORZANOIDEA PLUMBEA ROBERTI, *Mathews*. Spotless Crake.

Campbell states that this species occurs on Pelsart Island, "about the mangrove swamp" (there are numerous mangrove swamps on the island). Gibson saw a pair in November 1907, "on a rocky islet forming part of Rat Island." "This record for these birds," he very justly adds, "is, I think, somewhat unique." Judging from the localities it frequents on the mainland, this is one of the most unlikely birds one could think of to be found on these dry islands.

Falconiformes.

F A L C O N I D Æ.

CERCHNEIS CENCHROIDES UNICOLOR (*Milligan*). Nankeen Kestrel.

A bird of this species was seen on West Wallaby Island, and two days later another, or more probably the same individual, on North Island. Doubtless it was only a visitor from the mainland.

Coraciiformes.

ALCEDINIDÆ.

SAUROPATIS SANCTA WESTRALASIANA (*Campbell*). Sacred Kingfisher.

Hall found a pair frequenting an abandoned jetty at Pelsart Island, going in and out among the planking as if nesting. He shot the female.

Passeriformes.

HIRUNDINIDÆ.

HIRUNDO NEOXENA CARTERI, *Mathews*. Welcome Swallow.

Met with on almost every island. The birds appear to nest under the overhanging shelves or low cliffs found round most of the islands. On Pigeon Island a swallow was seen to carry nesting-material into a situation of this kind.

MUSCICAPIDÆ.

WHITEORNIS GOODENOVII RUFICAPILLUS, *Mathews*. Red-capped Robin.

Hall shot a young bird of this species on Pelsart Island, which he considered, doubtless correctly, as a stray visitor from the mainland.

TIMELIIDÆ.

PTENÆDUS MATHEWSI MATHEWSI (*Iredale*). Rufous Song-Lark.

Hall met with three birds of this species on Pelsart Island in the mangroves and shot one of them, a young male. He thought they might have nested on the island, but probably they were only visitors from the mainland.

SYLVIIDÆ.

SERICORNIS MACULATUS FUSCIPES, subsp. nov. Spotted Scrub-Wren.

Common amongst the bushes on East and West Wallaby Islands. In the 'Birds of Australia' Gould, after referring to the variability of *S. maculatus*, states that specimens from Houtman's Abrolhos differ from examples from the mainland in their rather smaller size, much greyer tint on the back, and much darker-coloured legs. In the Western Australian Museum are four rather poor specimens from the Abrolhos obtained by Milligan in November 1907. I have compared these with 16 specimens from various localities in S. W. Australia, including two from Albany, the type-locality of *S. maculatus*. There are also available four specimens from the islands in Sharks Bay, one of them from Bernier Island, the type-locality of *S. balstoni*, Grant, and the other three, which agree closely with it, from Dorré Island.

None of the specimens agrees with *S. mathewsi warreni*, Mathews, which is said to have a "greenish (not greyish) olive back," though there are examples from localities on both sides of the Warren River.

Specimens from the Abrolhos appear to be nearer to *S. mathewsi balstoni* than to typical *S. mathewsi maculatus*; they differ from both, however, in their very dark legs, as noticed by Gould. I am therefore using a new name for birds from these islands. They have much less of the rufous tinge on the rump than in *S. mathewsi maculatus*, and rather less than in *S. mathewsi balstoni*. The dark streaks on the throat are narrower than in *maculatus*, but rather larger than in *balstoni*. The size is almost the same as *balstoni*, distinctly smaller than *maculatus*. Mr. Lipfert found a nest of this bird on West Wallaby Island on December 2, 1894.

ZOSTEROPIDÆ.

ZOSTEROPS GOULDI, *Bonap.* Green-backed White-eye.

Noticed in small flocks or family-parties on almost every island or islet visited. They seem to have a special liking for mangroves. On several occasions they were seen flying from one islet to another. Mr. Lipfert found a nest containing one egg on Rat Island on November 23, 1894.

MOTACILLIDÆ.

ANTHUS AUSTRALIS, *Vieillot.* Australian Pipit.

Helms obtained one of these birds on Gun Island. We met with a pair on North Island. No doubt they are only visitors from the mainland, and probably they belong to the subspecies *A. a. bilbali*, Mathews.

SUMMARY.

MAMMALS.—The two indigenous species of Mammals are only found in the Wallaby Group, the Wallaby on both the large islands, the Rat, as far as is known, only on East Wallaby Island. The latter is probably, and the former certainly, subspecifically distinct from the mainland species.

SNAKES.—The three species of snakes do not appear to differ from the mainland forms. At present two have been found only on West Wallaby Island and the third on East Wallaby Island.

LIZARDS.—Four families are represented by some 19 species. The seven species of Geckonidæ are only known from the Wallaby Group, the two species of Pygopodidæ only from West Wallaby Island, and the single species of Agamidæ from the Wallaby Islands and North Island. The Scincidæ are represented throughout the group, though we only met with the smaller species of *Lygosoma* outside the Wallaby Group; one of the larger forms, *Egernia stokesi*, was, however, formerly plentiful on Rat Island.

FROGS.—Nothing is known as to the habitat of the two species recorded from the group.

BIRDS.—Of the 12 land-birds recorded from the Abrolhos, four (Kestrel, Robin, Song-Lark, and Pipit) are certainly only casual visitors, five others (Rail, Crake, Kingfisher, Swallow, and White-eye) are probably visitors from the mainland, though all but the Crake and Kingfisher have been known to breed; the remaining three are almost certainly residents.

Of these, the Pigeon and the Quail are found in the Wallaby Group and on North Island, the Scrub-Wren only on the Wallaby Islands. The two latter are subspecifically distinct from the mainland forms.

Looking now at the different groups of islands we find that *West Wallaby Island* has two snakes and two slow-worms confined to it, *East Wallaby Island* has one snake and one rat confined to it, whilst the two *Wallaby Islands* possess subspecies of a wallaby and a bird peculiar to them.

The *Wallaby Islands*, with *North Island*, possess also one lizard and two birds not found in the other groups, one of the birds being a subspecies peculiar to the group.

This distribution strongly suggests that the whole land-fauna of the group has been derived from the Wallaby Islands*. One of the chief features of the weather on the Abrolhos is the prevalence during the summer of "southerly busters," extremely strong southerly winds. The presence of the two birds on North Island is thus easily accounted for, and it is noteworthy that the one lizard which habitually climbs bushes is the one which has managed to reach that island. Doubtless at times the bushes on the sand-hills which it frequents are blown into the sea, and occasionally reach North Island.

The fact that the smaller skinks are found on many of the small sandy islets seems to show that the sea is no great barrier to their distribution. Probably their eggs are not damaged by floating in sea-water for some time. The larger Spiny-tailed Skink, *Egernia stokesi*, is a favourite food of the Sea-Eagles, and it is possible that individuals may be captured by them on the Wallaby Group and carried to Rat Island, and if one occasionally escaped this would account for their presence on that group.

A striking feature of the Abrolhos land-fauna is its southern character. Our knowledge of the distribution of animals in Western Australia is perhaps not sufficient to allow us to be dogmatic on the point, but there is every indication that when the islands were peopled from the mainland the fauna of the Geraldton district must have approximated much more than it does now to that of the extreme south-west. The range of *Macropus eugenii* does not now extend much north of Perth, whilst *Epimys fuscipes* is only known from the south coast and the islands of the Recherche Archipelago. *Ortygodes varius* and *Cosmopelia elegans* are not recorded from farther north than the Moore River, though it is not improbable that they may occur; *Porzanoidea plumbea* is not recorded from north of Perth.

* [A discussion on the origin of the fauna of the Abrolhos Islands will be given in the concluding paper of the series.—W. J. DAKIN.]

The most northerly record that I know for *Denisonia coronata* and for *Egernia whitei*, "Perth," is less than 30 miles north of Perth. *Lygosoma richardsoni* is known only from the Abrolhos. The remainder of the species are found farther north on the mainland, but there is not one of them which is not found in the south-west.

SECTION 2.—The Marine Vertebrates.

SEA-BIRDS.

Sphenisciformes.

SPHENISCIDÆ.

EUDYPTULA MINOR WOODWARDI, *Mathews*. Little Penguin.

Recorded by Hall without further particulars. I know of no other record of its occurrence north of Fremantle, and consider the record needs confirmation.

Procellariiformes.

HYDROBATIDÆ.

PELAGODROMA MARINA DULCIÆ, *Mathews*. White-faced Storm-Petrel.

Gilbert met with this species on a small island about three miles south of East Wallaby Island. The young birds were almost ready to leave their holes in January. Campbell found them nesting on Beacon Island; the burrows contained young about 10 days old on December 15th. Lipfert found eggs on a sand-patch off Wooded Island in November 1894; and Hall obtained eggs and nestlings on West Wallaby Island and South Island, Pelsart Group, in November 1899.

PROCELLARIIDÆ.

PUFFINUS ASSIMILIS TUNNEYI, *Mathews*. Allied Shearwater.

Campbell obtained a specimen of this bird at Rat Island, and Gibson noted them at several islands, principally on Wooded Island, where he obtained numerous almost full-grown young in the burrows (November 1907). Hall states that the eggs have been found on Pelsart Group in July. We saw them several times about West Wallaby Island. One individual was found sitting on the water in the daytime, others flying about at night, when, like the Mutton-birds, they seemed to be attracted by the lights of the ship. They are not nearly so abundant as the next species.

THYELLODROMA PACIFICA CHLORORHYNCHA (*Lesson*). Wedge-tailed Shearwater or Mutton-bird.

All those who have written about the Abrolhos have referred to the great

numbers of these birds. During the daytime they are to be seen flying over the sea in the neighbourhood of the islands in small or large flocks. We saw them on one occasion in pursuit of a shoal of fish, on which Roseate Terns, Dolphins, and Bonetas were also levying toll. Unlike the Terns, which dive straight down, the Mutton-birds first settle on the water and then plunge under, apparently with the assistance of their wings. When rising from the water the wings are half-spread, but not flapped, and the bird gets up the velocity required to start it in flight by paddling along the surface with its feet.

On the islands they appear from their burrows in great numbers as soon as it is dark, uttering the most weird and mournful cries. They are unable to stand on the ground, or to walk, so that they are obliged to use their wings, by whose aid they shuffle about among the bushes in a most awkward manner and are readily captured. They seem to be attracted by a light, as they often flew round the ship in the evening and once or twice came on board.

On many of the islands, especially West Wallaby Island and the southern end of Pelsart Island, their burrows are so numerous that when walking over the areas inhabited by them one sinks in, almost up to the knees, at every step. Their burrows were also seen on Rat Island, Long Island, and one of the Pigeon Islands. Fresh eggs were found in them on Pelsart Island, and Mr. Lipfert obtained them on Gun Island.

During one moonlight night I spent some time watching a Mutton-bird excavating a burrow in the sand. It used its feet alternately, throwing out an almost continuous stream of sand behind it to a distance of about a yard. The burrows when completed extend to a distance of two or three feet into the ground at an angle.

It strikes one as very remarkable that though the legs of these birds are not strong enough to support the weight of their body, yet they can be used for shovelling away sand continuously, apparently for hours. Moreover, they can use them as paddles on the water sufficiently rapidly to raise themselves from the surface when about to fly.

MACRONECTES GIGANTEUS ALBUS (*Potts*). Giant Petrel.

A specimen in the W.A. Museum was obtained at the Abrolhos in 1894. Campbell states (10), on the authority of Beddoes, that they visit the islands every winter, which is not improbable, as they occur off Fremantle every year during that season. The subspecific name which Mathews uses for the New Zealand and Australian form is singularly unfortunate, as, so far as I am aware, every specimen obtained in Western Australia has been completely dark in plumage without a single white feather. There are six specimens in the W.A. Museum, and I have seen remains of several others washed up on the beach.

DIOMEDEIDÆ.

NEALBATRUS CHLORORHYNCHUS CARTERI (*Rothschild*). Yellow-nosed Mollymawk.

A skull obtained on Pelsart Island in 1894 is in the W.A. Museum. When on the unfortunate Federal trawling ship 'Endeavour,' in June 1912, I found these birds numerous in the neighbourhood of the Abrolhos.

Lariformes.

LARIDÆ.

HYDROPROGNE TSCHEGRAVA STRENUA (*Gould*). Caspian Tern.

These birds occur in pairs or in small colonies on nearly all the islands, often nesting in company with other species. We found eggs or young birds on West Wallaby Island, one of the Pigeon Islands, Long Island, Wooded Island, and Pelsart Island. In most cases young birds were more numerous than eggs, and some of the young were almost fledged. Mr. Mathews, in the 'Birds of Australia,' states that the Australian form of Caspian Tern never nests in colonies, but on Wooded Island I counted eight nests close together, whilst, judging by the number of old birds, there was a larger colony at one spot on Pelsart Island. Hall reported a colony of some 13 pairs nesting on West Wallaby Island in 1899.

THALASSEUS BERGII (*Lichtenstein*). Crested Tern.

Distributed throughout the islands. Breeding colonies were met with on West Wallaby Island, Wooded Island, and Pelsart Island. The young birds were much more numerous than the eggs, and many of them were almost fully fledged. There are two specimens in the W.A. Museum from the Abrolhos, but I have been unable to decide whether they should be referred to *T. bergii pelecanoides* (King) or *T. bergii gwendolene*, Mathews. They do not appear to differ in size from birds from Barrow Island and Bedout Island, which would be the former according to Mathews, but they are also similar to birds from the neighbourhood of Perth, the type-locality of the latter. The only specimen in the W.A. Museum, which is decidedly larger than any of the others, is one from Esperance on the south coast.

STERNA DOUGALLI GRACILIS (*Gould*). Roseate Tern.

These birds were met with in large flocks sitting on the reefs on North Island, East Wallaby Island, Long Island, Rat Island, Wooded Island, and Pelsart Island. We did not find them nesting until the last day of our visit, when we found a considerable colony on the north end of Pelsart Island which had just begun to lay on the piles of coral fragments. Campbell also found them nesting on Pelsart Island.

[*STERNULA ALBIFRONS TORMENTI* (*Mathews*). White-shafted Ternlet.

Campbell states that he saw a pair of these birds near Rat Island in company with Little and Caspian Terns. He obtained a skin, but appears to be doubtful whether it may not be a young *S. nereis*. The record needs confirmation, as there is no other record of this species from the southern half of the western coast of Australia.]

STERNULA NEREIS HORNI (*Mathews*). White-faced Ternlet.

These little birds were seen on practically every island visited, and from their behaviour it seems probable that isolated pairs, or a few pairs together, nest on nearly all the sandy beaches or heaps of dead coral. We only found nests on the east side of West Wallaby Island, where there was a colony of several hundred individuals. The eggs were fresh or very slightly incubated, one, two, or three being the numbers found in a nest. Campbell, Lipfert, and Gibson all found colonies nesting on Pelsart Island.

ONYCHOPRION FUSCATA SERRATA (*Wagler*). Sooty Tern.

There can be no doubt that this is the most plentiful bird found on the Abrolhos at the present time during the nesting season. On Rat Island their numbers are prodigious, they nest under almost every bush and in many places also amongst the herbage; there is also a very large colony on the south end of Pelsart Island and another on Wooded Island. In the Wallaby Group they are not found on the Wallaby Islands, nor on North Island, but there are great numbers on all the smaller islands, the Pigeon Islands, Long Island, and Pelican Island. On Rat Island, Wooded Island, and Pelsart Island most of them had eggs at the time of our visit, though a fair number of young birds had already been hatched, but, curiously enough, those in the Wallaby Group had scarcely begun nesting, as only one egg was found—on Long Island.

MELANOSTERNA ANÆTHETUS NOVÆHOLLANDIÆ (*Stephens*). Bridled Tern.

We only met with a single pair of this species on a small islet off Rat Island, and did not find a nest. Gilbert and Campbell both found them breeding in small numbers, but do not state on which island or islands. Lipfert and Gibson found a few nests on Pelsart Island. There is no doubt that this is the rarest of the Laridæ which nest in the Archipelago.

ANOUS STOLIDUS GILBERTI, *Mathews*. Noddy Tern.

This species nests in very large numbers on Rat Island and the south end of Pelsart Island, whilst there is a smaller colony on Wooded Island. In each case their colonies occur amongst those of the Sooty Tern, most of the nests being built on the bushes, though in many cases they are flat on the ground; these latter appear to be those of birds which have failed to obtain

a site on the top of the bushes within the limits of the colony, and, rather than utilise bushes only a few yards away from the rest of their species, they are content to take up a position on the ground. At the time of our visit the majority of the nests contained eggs, though many young birds had already been hatched. All previous writers on the group have referred to the absurd tameness of the Noddies : they have to be lifted from the nest in order to see what it contains, though this has to be done with caution as they give vicious pecks with their beaks. Many of them undoubtedly fall victims to the cats, and were it not that these latter are kept down by the difficulty of finding food at other seasons of the year, when they appear to feed chiefly on crabs, it would doubtless not be long before the Noddies were exterminated. As it is, their numbers are only exceeded by those of the Sooty Terns.

MEGALOPTERUS TENUIROSTRIS MELANOPS (*Gould*). Lesser Noddy.

These birds were discovered on Pelsart Island by Gilbert in 1842, though Stokes had previously observed their curious nests. Gilbert's remarkably vivid account of their numbers and nesting-habits, first read by Gould at the meeting of the Zoological Society on February 27, 1844, and published in the *P.Z.S.* for that year, has been quoted by every writer who has since dealt with this subspecies, for the colony on the Abrolhos is still its only known breeding-place. The following quotations give an idea of the number of birds at the time of Gilbert's visit. He wrote :—"I have seen many vast flocks of birds, but I must confess I was not at all prepared for the surprise I experienced in witnessing the amazing clouds (literally speaking) which these birds present when congregating in the evening . . . even Audubon, who has been so accustomed to see such vast flocks of the passenger pigeon, could hardly avoid expressing surprise if he had an opportunity of seeing these birds at sunset, moving in one immense mass over and around their roosting-place ; while the noise of the old birds' quack and the piping whistle of the young ones is almost deafening." I regret to have to record that these great flights, like those of the passenger pigeon, are now a thing of the past. Campbell wrote in 1890 :—"Now that a successful guano depôt has been established upon Pelsart Island, no doubt in time the limited supply of mangrove trees will be used for fuel. What then will become of the extraordinary flights of the Lesser Noddies as they go to and from their fishing grounds? I trust the photographs I took will not soon be the 'light of other days.'" Mr. Lipfert tells me that when he visited the Abrolhos five years later, in 1894, the birds were still nesting on Pelsart Island, as they were also at the time of his visit with Helms in 1897. Hall also found them there in 1899.

On Gibson's visit in 1907 they were only found on Wooded Island, so that some time during the intervening eight years the whole colony moved

from one group to another. It is a great pity that it is not known how this exodus took place, nor for certain what was its cause. The cutting down of the mangroves, suggested by Campbell, has not taken place, as I believe they only furnish very inferior timber for burning. Prof. Dakin tells me that some years ago the soil of the mangrove swamp was dug out from the roots of the trees, being almost pure guano, and probably this disturbed the birds so much that they removed to their new home.

Wooded Island, in spite of its name, has not so many mangroves as Pelsart Island, and almost every tree is covered by their nests. Their numbers at the present time, however, cannot be anything like what they were 30 years ago, as they are certainly far fewer than either the Sooty Terns or the Noddies. Moreover, there is every reason to fear that they are still decreasing, for every occupied nest on the trees there are several old ones, and Prof. Dakin tells me that on his last visit, in 1915, he thought there were fewer nests occupied than when I was with him in 1913. I can suggest no reason for this decline; there are no obvious enemies of these birds on Wooded Island, but it appears that the guano accumulated below their nests on Wooded Island is likely to be worked before long, when presumably they will have to make another move. This could not have been long delayed in any case, as the accumulation of the guano round the roots of the mangroves is rapidly killing the trees, and it is unlikely that the birds would continue to nest on the boughs of the dead trees. It is to be hoped that a change to another island may lead to an increase in their numbers, otherwise I fear they must be regarded as the last remnant of a dwindling race.

BRUCHIGAVIA NOVÆHOLLANDIÆ LONGIROSTRIS (*Masters*). Silver Gull.

These birds occur throughout the group. Small colonies were found nesting on West Wallaby Island, an islet off Rat Island, Wooded Island, and Pelsart Island. A few eggs were still not hatched, and young birds were met with in every stage from newly hatched to fully fledged.

GABIANUS PACIFICUS GEORGII (*King*). Pacific Gull.

Not so plentiful as the Silver Gull, but distributed over all the islands. No eggs were found, but young birds half-grown or fully fledged were noted on West Wallaby Island, Long Island, Wooded Island, and Pelsart Island. Mr. Lipfert found fresh eggs on an island off Rat Island on October 7, 1894.

Charadriiformes.

ARENARIIDÆ.

ARENARIA INTERPRES OAHUENSIS (*Bloxham*). Turnstone.

A very common summer visitor, found round the shore on all the islands.

HÆMATOPODIDÆ.

HÆMATOPUS OSTRALEGUS PICATUS (*King*). Pied Oyster-catcher.

Small parties of this species, or in some cases only single pairs, were seen on North Island, East and West Wallaby Islands, the Pigeon Islands, and Pelsart Island. On the latter they were several times met with on the ridges of broken coral in the centre of the island, suggesting that they were nesting there, but no nests were found. The two specimens from the Abrolhos in the W.A. Museum are referable to the northern race *picatus*.

HÆMATOPUS NIGER BERNIERI (*Mathews*). Black Oyster-catcher.

These birds were seen on the reefs at North Island, West Wallaby Island, Wooded Island, and Pelsart Island. They were not quite so numerous as the preceding species, with which they often associated. Mr. Lipfert found a nest containing one fresh egg on November 24, 1894.

CHARADRIIDÆ.

SQUATAROLA SQUATAROLA HYPOMELAS (*Pallas*). Grey Plover.

A specimen in the W.A. Museum was obtained on the Abrolhos in the summer of 1894. We saw a flock of birds, either of this species or Golden Plovers, on the shore of West Wallaby Island.

LEUCOPOLIUS RUFICAPILLUS TORMENTI (*Mathews*). Red-capped Dotterel.

Very abundant on the sandy shores of North Island and East and West Wallaby Islands, but not met with in the southern groups, where sandy beaches are unusual. Breeding was apparently over, or nearly so, as young birds were often seen with the adults on the beaches, but on West Wallaby Island pairs of birds were met with on the sandy flats in the interior of the island as if nesting.

SCOLOPACIDÆ.

NUMENIUS CYANOPUS, *Viillot*. Australian Curlew.

Campbell met with this species in the Wallaby Group in the summer of 1889.

PHÆOPUS PHÆOPUS VARIEGATUS (*Scopoli*). Whimbrel.

Campbell records that he saw a small flock at "the mangrove swamp" on Pelsart Island on December 23, 1889.

VETOLA LAPPONICA BAUERI (*Naumann*). Barred-rumped Godwit.

Lipfert shot a specimen on Gun Island in the summer of 1894.

HETEROSCELUS INCANUS BREVIPES (*Vieillot*). Grey-rumped Sandpiper.

A specimen in the W.A. Museum was obtained on the Abrolhos by Lipfert in the summer of 1894.

ACTITIS HYPOLEUCUS AURITUS (*Latham*). Common Sandpiper.

A specimen in the W.A. Museum was obtained on the Abrolhos by Lipfert in the summer of 1894.

GLOTTIS NEBULARIUS GLOTTOIDES (*Vigors*). Greenshank.

A specimen in the W.A. Museum was obtained on the Abrolhos by Lipfert in the summer of 1894.

PISOBIA MINUTA RUFICOLLIS (*Pallas*). Little Stint.

Frequent, especially about the Wallaby Islands. Recorded by Gilbert and Campbell. Four specimens shot by Lipfert in the summer of 1894 are in the W.A. Museum.

EROLIA FERRUGINEA CHINENSIS (*Gray*). Curlew-Sandpiper.

Seen on the shores of West Wallaby Island. Recorded by Campbell. A specimen from the Abrolhos is in the W.A. Museum.

ANTELIOTRINGA TENUIROSTRIS (*Horsfield*). Great Knot.

A specimen obtained by Lipfert on the Abrolhos in the summer of 1894 is in the W.A. Museum.

No doubt this list of wading birds would be enlarged by further collecting, as several other species commonly found in South-West Australia during the summer must visit the Abrolhos at times.

Ardeiformes.

ARDEIDÆ.

DEMIGRETTA SACRA COOKTOWNI, *Mathews*. Reef-Heron.

Seen on the reefs at North Island, one of the Pigeon Islands, Rat Island, Wooded Island, and Pelsart Island. Two nests were found on Wooded Island, in both cases situated on a ledge of rock behind a bush under an overhanging cliff at the edge of a lagoon. One nest was empty, the other contained two fresh eggs. All the birds were blue, except one of a pair seen flying together at North Island which was white. To my mind the evidence points to these two forms being an example of dimorphism within the species, and I am therefore using the well-known name of *sacra* for the species. It was rejected by Mathews as having been applied to an intermediate form which he regards as a hybrid, but whether the two forms are distinct species or not, I think the evidence is clear that a true Mendelian segregation occurs

when they breed together. In that case the origin of the rare intermediate forms may be due to incomplete segregation or they may be simply variations of the white form. It is a pure assumption that they are of hybrid origin, hence I think the name *sacra* should be retained.

Auseriformes.

ANATIDÆ.

CHENOPIS ATRATA (*Latham*). Black Swan.

I am informed by Mr. O. Lipfert that a specimen was shot on Gun Island in 1894. It is distinctly surprising to find that this bird flies so far out to sea, especially as the islands do not afford lakes of the kind usually frequented by swans.

[VIRAGO CASTANEA (*Eyton*). Green-headed Teal.

Campbell states that this species occurs in the Wallaby Islands. In view of the confusion between this species and *V. gibberifrons*, and the absence of any specimens, the record requires confirmation.]

Pelecaniformes.

PHALACROCORACIDÆ.

HYPOLEUCUS VARIUS PERTHI, *Mathews*. Pied Cormorant.

These birds are found everywhere round the islands. We only found one colony nesting on West Wallaby Island, where they were in company with Caspian and Crested Terns, and Silver and Pacific Gulls. The nests contained fresh eggs, and when the birds flew off at our approach the Silver Gulls seized the opportunity to feed upon the eggs of their more timid neighbours.

On an islet off Rat Island, we found the nests of an old colony not being used that year. On a little island at the western side of the lagoon, south of the Wallaby Group, we found a number of eggs lying about among the bushes. Cormorants were sitting on the shore on this islet, but they were evidently not nesting there, as there were no nests and the eggs were on or under the bushes promiscuously. Mr. Lipfert obtained eggs on Middle Island in 1894.

PHÆTHONTIDÆ.

SCÆOPHÆTHON RUBRICAUDA WESTRALIS, *Mathews*. Red-tailed Tropic Bird.

A pair of these birds with their single egg, obtained by Mr. Lipfert on Rat Island in November 1894, are in the W.A. Museum.

Subsequently Beddoes wrote to Campbell (10) that he had "found Tropic Bird nesting on Pelsart Island, month February, two eggs, both hard-set. Following February two nests, same kind, were taken on Rat Island; two

eggs in each." Mathews, in commenting upon this record, remarks that one egg is the usual clutch, and it seems to me probable that the late Mr. Beddoes made some mistake in the matter.

[LEPTOPHÆTHON LEPTURUS DOROTHEÆ, *Mathews*. White-tailed Tropic Bird.

Recorded by Campbell as an occasional visitor, but he does not state that he saw the species himself nor on what evidence he relied. As there is no other record of the species on the west coast of Australia it requires substantiation.]

PELECANIDÆ.

CATOPTROPELECANUS CONSPICILLATUS (*Temm. & Laug.*). Australian Pelican.

Small parties of these birds were seen on West Wallaby Island, opposite Pelican Island, as well as on Rat Island. We found no evidence that they were or had been nesting, though I specially visited the small island known as Pelican Island, as its name and the presence of pelicans in the vicinity suggested that it might be their stronghold.

Campbell states that they have been known to nest on Pigeon Island, whilst Gibson was told that they nested on West Wallaby Island, appropriating the nest of the Pied Cormorant in which to lay their eggs. Both state that the breeding-season is early (Sept., Oct.).

Falconiformes.

AQUILIDÆ.

CUNCUMA LEUCOGASTER (*Gmelin*). White-bellied Sea-Eagle.

These birds were met with on North Island and all of the southern groups. Their nests were found on several of the small islets in the Wallaby Group, but the young had already flown. Campbell states that they lay in September. Judging from the remains met with round the nests, they feed chiefly on the larger lizards and on Mutton-birds and Terns.

PANDIONIDÆ.

PANDION HALIAËTUS CRISTATUS (*Vieillot*). Osprey.

Much more numerous than the Sea-Eagle, especially on Pelsart Island. Their nests were found on all the groups, generally on small islets. On Pelsart Island, where they nest on the island itself, three nests were found, in each of which was a fully-fledged young bird. Though these were apparently able to fly they did not attempt to do so, but either lay flat in the nest or adopted a threatening attitude with their wings raised and feathers spread. The old birds, meanwhile, circled round high in the air uttering shrill cries.

MAMMALIA.

Carnivora Pinnipedia. OTARIIDÆ.

EUMETOPIAS ALBICOLLIS (*Péron*). White-necked Hair-Seal.

[*Otaria albicollis*, *Péron*, Voyage de Découvertes aux Terres Australes, vol. ii. p. 118 (1816); J. W. Clark, P. Z. S. 1875.

Arctocephalus lobatus, Gray, Spicilegia Zool., part i. 1828; Gray, Cat. of Seals and Whales, 1866; Gould, Mammals of Australia, vol. iii. pl. xlix.

Otaria australis, Quoy & Gaimard, Voyage de l'Astrolabe, Zool. vol. i. 1830.

Arctocephalus australis, Gray, Cat. of Seals and Whales, 1866.

Zalophus lobatus, Ogilby, Cat. of Australian Mammals, 1892; Lucas and Le Souef, Animals of Australia, 1909.]

Hair-Seals were noted on the group by Stokes; and Gilbert secured specimens which were figured by Gould in his 'Mammals of Australia,' as well as writing an account of their habits. They were evidently very plentiful on the Abrolhos at that time—at any rate, in the breeding-season. Nowadays only a few individuals are to be seen there, as on most other parts of the West Australian coast.

I have given a full synonymy of this species, as, though Gould expressly states that he was not sure of the proper name to use for his Abrolhos specimens, he was, nevertheless, followed by Ogilby and by Lucas and Le Souef, the only recent writers, so far as I am aware, who have mentioned the species. I had reached the conclusion that *Péron's* name should be used before I read the paper by J. W. Clark, and was confirmed in my view by finding that he had reached the same conclusion in 1875.

Cetacea. BALÆNIDÆ.

MEGAPTERA LONGIMANA, *Rud.* Humpback Whale. Portions of the skeleton of a whale of this species were lying about on the shore of Pelsart Island. In Oct. 1914, when travelling down the coast on the ss. 'Minderoo,' I saw a number of Humpbacks in the neighbourhood of the Abrolhos. Prof. Dakin tells me that some came into Whale Bay in the Pelsart Group during his visit in 1915—apparently, as we were told by the fishermen, to scrape themselves on the rocks.

DELPHINIDÆ.

[*SOTALIA GADAMU* (*Owen*). Gadamu Dolphin. This appears to be the common "Porpoise" of the West Australian coast, and I presume that the specimens seen at the Abrolhos belong to this species, but there is at present no definite specimen from the group to determine the point.]

REPTILIA.**Chelonia.**

CHELONIIDÆ.

CHELONIA MYDAS, *Linn.* Green Turtle.

This species visits North Island and West Wallaby Island, but we were not fortunate enough to see any*.

It is curious that no species of Sea-Snake has yet been recorded from the Abrolhos, as several species occur farther south on the mainland.

PISCES.

A considerable number of small collections of fish have been made at the Abrolhos from time to time. Some coloured drawings were made by Lieut. Emery, one of the officers of H.M.S. 'Beagle' in 1840, and are referred to by Richardson (11, 12), and it is possible that specimens were also obtained. Richardson (12) also refers to specimens collected by Gilbert in 1842, and Ogilby in 1899 described (13) some fish collected at the Abrolhos by Mr. A. M. Lea.

Most of the records in the following list, however, are based on specimens in the Western Australian Museum. Of these some were collected by Saville Kent, some were presented by Mr. F. C. Broadhurst, others were collected by Lipfert in 1894 and 1897, and Conigrave in 1907; whilst, finally, the specimens obtained on the two Percy Sladen Trust Expeditions have been added.

Unless otherwise stated the reason for inclusion in the following list is the presence of a specimen in the W.A. Museum:—

Pleurotremata. GALEORHINIDÆ.

GALEORHINUS ANTARCTICUS (*Günth.*). Gummy Shark. Two specimens caught off the north end of Pelsart Island in 1913.

HETERODONTIDÆ.

HETERODONTUS PHILIPPI, *Bloch & Schneider.* Bull-head or Port-Jackson Shark. Several fine specimens caught at North Island in 1913.

Hypotremata. RHINOBATIDÆ.

RHINOBATUS BANKSI, *Müller & Henle.* Shovel-nosed Ray.

Isospondyli. CLUPEIDÆ.

CLUPANODON NEOPILCHARDUS (*Steind.*). Australian Pilchard.

* [They were seen by me on the occasion of the Expedition of 1915.—W. J. DAKIN.]

GONORHYNCHIDÆ.

GONORHYNCHUS GREYI, *Rich.* Beaked Salmon or Rat-fish.

Ostariophysii. ARIIDÆ.

[GALEICHTHYS THALASSINUS, *Rüpp.* Salmon Cat-fish. A poor specimen, probably of this species.]

PLOTOSIDÆ.

CNIDOGLANIS MEGASTOMUS (*Rich.*). Estuary Cobbler. Young specimens obtained in 1915.

Apodes. MURÆNIDÆ.

LYCODONTIS WOODWARDI (*McCulloch*). The type of this species was from the Abrolhos (see 'Records of W.A. Museum,' vol. i. p. 80), and to it McCulloch assigns the specimen from the Abrolhos referred by Richardson (12) to *Muraena nubila*. A third, very young, specimen was obtained by Prof. Dakin in 1915.

Synentognathi. HEMIRHAMPHIDÆ.

HYPORHAMPHUS INTERMEDIUS (*Cant.*). Sea-Garfish.

Percesoces. SPHYRÆNIDÆ.

SPHYRÆNA OBTUSATA, *Cuv. & Val.* Sea-Pike.

Berycomorphi. BERYCIDÆ.

TRACHICHTHODES AFFINIS (*Günth.*). Nannygai or Red Snapper.

Percoidea. SERRANIDÆ.

THERAPON HUMERALIS, *Ogilby*. The type came from Pelsart Island, and the species has not been obtained except in the Abrolhos group.

ACANTHISTIUS SERRATUS, *Cuv. & Val.* Wirrah.

EPINEPHELUS MERRA, *Bloch*.

EPINEPHELUS FASCIATUS (*Forsk.*).

EPINEPHELIDES LEAI, *Ogilby*. The type was from Pelsart Island. It would appear rather doubtful whether the species is really distinct from *E. armatus* (*Cast.*).

COLPOGNATHUS DENTEX, *Cuv. & Val.*

HYPOPLECTRODES NIGRORUBRUM, *Cuv. & Val.*

DAMPIERIA LINEATA, *Cast.*

PLESIOPIDÆ.

PARAPLESIOPS MELEAGRIS, *Peters*. A small specimen obtained in 1915.

CHILODIPTERIDÆ.

AMIA RUEPELLI (*Günth.*). Gobble-guts.

SILLAGINIDÆ.

SILLAGO BASSENSIS, *Cuv. & Val.* School Whiting.

CARANGIDÆ.

CARANX GEORGIANUS, *Cuv. & Val.* Skipjack.

TRACHURUS DECLIVIS, *Jenyns*. Horse-Mackerel.

CENTROPOMIDÆ.

GLAUCOSOMA HEBRAICUM, *Rich.* Jew-fish. The type of this species was from Abrolhos. Several were obtained by us. It is the best food-fish found in the group.

LATES CALCARIFER, *Bloch.* Giant Perch.

LUTIANIDÆ.

LUTIANUS CHRYSOTENIA, *Bleek.*

NEMIPTERIDÆ.

SCOLOPSIS BIMACULATUS, *Rüpp.*

LETHRINIDÆ.

LETHRINUS OPERCULARIS, *Cuv. & Val.*

PENTAPUS VITTA, *Cuv. & Val.* Butter-fish. Obtained by us at North Island.

SPARIDÆ.

PAGROSOMUS AURATUS (*Forst.*). Schnapper. The chief food-fish of the group; it is stated to be much less plentiful than was formerly the case.

SPARUS SARBA, *Forsk.* Silver Bream.

SCORPIDIDÆ.

NEATYPUS OBLIQUUS, *Waite*. The type was from the Abrolhos (see Records of Austral. Mus. vi. p. 64); a second specimen from off Geraldton was presented to the W.A. Museum by Prof. Dakin in 1918.

KYPHOSIDÆ.

KYPHOSUS SYDNEYANUS, *Günth.* Buffalo-Bream.

GIRELLIDÆ.

TEPHRÆOPS TEPHRÆOPS (*Rich.*) Buffalo-Bream.

ENOPLOSIDÆ.

ENOPLOSUS ARMATUS (*Shaw.*) Old-Wife.

CHÆTODONTIDÆ.

MICROCANTHUS STRIGATUS (*Cuv. & Val.*) Footballer.

CHIRONEMIDÆ.

TREPTEERIUS MACULOSUS, *Rich.* Spotted Kelp-fish.

CHILODACTYLIDÆ.

GONIISTIUS GIBBOSUS, *Rich.* Magpie-Perch.

DACTYLOPHORA NIGRICANS, *Rich.* Dusky Morwong.

POMACENTRIDÆ.

HYPSIPOPS MICROLEPIS, *Günth.*

LABRIDÆ.

PSEUDOLABRUS PARILUS (*Rich.*)

LEPIDAPLOIS VULPINUS (*Rich.*)

ACHÆRODUS GOULDI (*Rich.*) Blue Groper. We obtained several of these fish; they are very good eating when fresh.

CORIS AURICULARIS, *Cuv. & Val.* Parrot-fish. Probably the commonest fish of the group. Extremely variable in colour, but the dark tip to the operculum is characteristic. Lieut. Emery made drawings of two colour-varieties in 1840.

OPHTHALMOLEPIS LINEOLATUS, *Cuv. & Val.* Rainbow-fish.

THALASSOMA LUNARE (*Linn.*) Crescent-tail.

THALASSOMA ANEITENSE, *Günth.*

These two species of *Thalassoma* seem always to occur together, and it seems to me probable that they are the two sexes of the same species.

ODACIDÆ.

ODAX RICHARDSONI, *Günth.* Weedie or Rock-Whiting.

OLIOTHOPS CYANOMELAS, *Rich.* Herring-Kale.

SCARIDÆ.

HETEROSCARUS FILAMENTOSUS, *Cast.*

PSEUDOSCARUS GMYNOGNATHUS, *Bleek.* Recorded from Pelsart Island by Ogilby.

Gobioidea. G O B I I D Æ.

CALLOGOBIUS MUCOSUS (*Günth.*). Obtained in 1915.

Several other species of Goby have been obtained, but have not been identified.

Blennioidea. B L E N N I I D Æ.

BLENNIUS TASMANIANUS, *Rich.* Obtained at Sandy Island in 1913.

Other Blennies have been obtained, but not identified.

C O N G R O G A D I D Æ.

CONGROGADUS SUBDUCENS, *Rich.*

Scorpænoidea. S C O R P Æ N I D Æ.

SYNANCEJA HORRIDA (*Linn.*). Devil-fish.

NEOSEBASTES PANDA (*Rich.*). This species was founded on a drawing made by Lieut. Emery at the Abrolhos in 1840. It is also in the W.A. Museum collection.

SCORPÆNA SUMPTUOSA, *Cast.*

P L A T Y C E P H A L I D Æ.

PLATYCEPHALUS BASSENSIS, *Cuv. & Val.* Flathead.

T R I G L I D Æ.

CHELIDONICHTHYS KUMU, *Less & Garn.* Gurnard.

Plectognathi. B A L I S T I D Æ.

MONACANTHUS CHINENSIS, *Bloch.* Recorded from the Abrolhos by Richardson. A specimen was obtained by Prof. Dakin in 1915.

MONACANTHUS MEGALURUS, *Rich.*

CANTHERINES GRANULATUS (*Shaw*).

CANTHERINES HIPPOCREPIS (*Quoy & Gaim.*).

CHELETODERMIS MACCULLOCHI, *Waite.* The type-specimen came from the Abrolhos (see Records of Austral. Museum, vi. p. 81). It has not since been met with.

OSTRACIONTIDÆ.

ANOPLOCAPROS LENTICULARIS, *Rich.*

TETRODONTIDÆ.

SPHEROIDES PLEUROGRAMMA, *Regan.* Blow-fish

Pediculati. BATRACHIDÆ.

CORYZICHTHYS DIEMENSIS (*Rich.*). Recorded from the Abrolhos by Richardson. There is a specimen in the W.A. Museum.

SUMMARY.

The marine fauna of the Abrolhos Islands was stated by Saville Kent (14) to be a remarkable mixture of temperate and tropical forms. Apart from the corals, which are outside the scope of the present paper, he specially instanced the fish, many of which he stated were common to the Abrolhos and the Barrier Reef and Torres Straits. It will be worth while therefore to examine how far his statement is borne out by the distribution of the marine vertebrates recorded in the present paper.

SEA-BIRDS.—The 36 species of sea-birds which occur on the group may be divided into the following groups. *Summer visitors*—11: wading birds from the Northern Hemisphere, all of which travel farther down the coast than the Abrolhos. *Winter visitors*—2: the Yellow-nosed Albatross has been recorded from as far north as Point Cloates, the Giant Petrel has not been met with north of the Abrolhos. The breeding-places of both are unknown, but are doubtless much farther south. Other southern sea-birds probably occur about the Abrolhos in winter, but almost all the collecting done on the group has been carried out in summer. *Casual visitor*—1: the Black Swan.

The remaining 22 species all breed on the group. Of these 12 are forms found breeding in other localities along the west coast, both north and south of the Abrolhos. Four are not known to breed farther north than the Abrolhos, viz., *Pelagodroma marina dulcicæ*, *Puffinus assimilis tunneyi*, *Sternula nereis horni*, and *Gabianus pacificus georgii*. Five are not known to breed farther south than the Abrolhos, viz., *Sterna dougalli gracilis*, *Onychoprion fuscata serrata*, *Anous stolidus gilberti*, *Hematopus ostralegus picatus*, and *Sceophaethon rubricauda westralis*. The Abrolhos form of the Lesser Noddy, *Megalopterus tenuirostris melanops*, is not known to breed anywhere else, but as its near ally *M. tenuirostris tenuirostris* breeds in the Seychelles it may be accounted a northern form.

Judging from the sea-birds, therefore, we may conclude that there is a distinct admixture of northern and southern forms, and the three most plentiful species—the Sooty Tern, Noddy, and Lesser Noddy—are all forms which are specially characteristic of tropical islands.

MARINE MAMMALS.—No conclusions can be drawn from the presence of the Seal, as it is, or was, found all round the western half of the continent.

REPTILES.—The Green Turtle, plentiful in the north-west, has not been recorded from farther south than the Abrolhos.

FISH.—The fish-fauna of the north-west coast of Australia is still too little known to allow of a very complete comparison of the northern and southern forms found at the Abrolhos. Sixty-seven species are recorded from the group, of which 5 are not at present known from any other locality, and 4 more do not appear to have been found on the west coast of the mainland. Of the remaining 58, 14 are found generally along the coast-line, 34 do not appear to have been found farther north than the Abrolhos, and 10 are not known from farther south. Of these 10 species, two, *Epinephelus merra* and *Lethrinus opercularis*, have been obtained as far south as New South Wales on the east coast of Australia, so that their most southerly record on the west coast is not remarkable. The remaining 8 northern forms are as follows:—*Lates calcarifer* (N. Australia to India), *Lutianus chrysotenia* (N.W. Australia through Malay Archipelago to Nicobar Islands), *Scolopsis bimaculatus* (N. Australia to China, India, and Red Sea), *Thalassoma lunare*, and *T. aneitense* (N. Hebrides, Norfolk I., and Lord Howe I. to N.W. Australia), *Congrogadus subducens* (N.W. and N. Australia), *Synanceja horrida* (N. Australia to India), *Coryzichthys diemensis* (N.W. and N. Australia).

These 8 species certainly appear to range further south on the west coast of Australia than they do on the east, but there is no good evidence that they occur much further south on the Abrolhos than they do on the mainland. From the next area northward of whose fish anything is known, Shark's Bay, at least 4 of these species have been obtained, viz., *Lutianus chrysotenia*, *Thalassoma lunare* and *T. aneitense*, and *Synanceja horrida*.

It will be worth while to quote here Saville Kent's summary for contrast with the foregoing facts. He states (14)—“The fish fauna of Houtman's Abrolhos was found, as might be anticipated in virtue of its essentially migratory constituents and its proximity to areas of relatively cool water, an interesting admixture of both tropical and temperate species. Conspicuous among the fishes indigenous to the temperate Australian sea-board may be mentioned such species as the Schnapper (*Pagrus major*), the Sergeant Baker (*Aulopus purpurissatus*), Australian Whiting (*Sillago ciliata*), Yellow-tail (*Seriola gigas*), and a species of what in the Sydney market would be designated a Morwong (*Chilodactylus*). Characteristic tropical fish were, on the other hand, specially represented by innumerable varieties of Parrot-fishes, Labridæ and Scaridæ. Many of these, it is interesting to observe, such as species of *Julis* and *Pseudoscarus*, had not been met with by the writer farther north on the Western Australian coast, but were familiar to

him, as in the case of the Holothuridæ, as inhabitants of Torres Straits and the Queensland Great Barrier region. Such species, again, as *Platax orbicularis* and *Mesoprion Johni*, the Golden Schnapper of Thursday Island, Torres Straits, may be mentioned among the essentially tropical forms that were found frequenting the Abrolhos reefs."

We may, perhaps, suggest that the "innumerable varieties of Parrot-fishes" were chiefly forms of *Coris auricularis*, which, as already mentioned, is the commonest fish and is very variable in colour; the record of *Platax orbicularis* may refer to *P. teira*, which has been found on the west coast as far south as Fremantle, whilst *Lutianus chrysozona* may have been mistaken by Saville Kent for *L. (Mesoprion) johni*. Otherwise, it would be strange if the few species mentioned by him in support of his statement had none of them been obtained by anyone else.

To the writer it would seem more remarkable that the fish-fauna of the Houtman's Abrolhos coral-reefs should consist mainly of species characteristic of the southern coast of Australia, than that a few of the tropical species associated with coral-reefs further north should be found there.

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